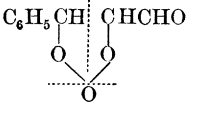
Monomolecular glyoxal is prepared by distilling a mixture of commercial glyoxal (4) with phosphorus pentoxide, and cooling the distillate by means of solid carbon dioxide and ether. Care must be taken to avoid the presence of moisture in the apparatus. The compound crystallizes in yellow prisms or spangles, becomes opaque at 10°, melts at 15° and boils at 50°. The vapor is intensely emerald green and condenses to a liquid which is at first green; as this is cooled it becomes yellow and, at very low temperatures, colorless. The vapor has an odor like that of formic aldehyde, but as inhalation continues the smell becomes sweet and not disagreeable. It burns with a violet flame and forms with air a mixture which explodes violently on the application of a flame. Glyoxal changes spontaneously into paraglyoxal (3) in a few hours, but on the addition of a *little* water the transformation is instantaneous. If, however, glyoxal be *added to a large* volume of water it dissolves with a hissing noise and the resulting liquid, which has a decidedly acid reaction, consists of an aqueous solution of monomolecular glyoxal (1). The glyoxal volatilizes with the steam when the solution is boiled. The solution readily reduces ammoniacal silver nitrate solution, but not Fehling's solution, in which latter respect it resembles the poly- and para-modifications.

Trimolecular glyoxal (2) is readily prepared by treating cinnamic aldehyde, $C_6H_5CH:CHCHO$, with ozone. The resulting ozonide, when mixed with water, gives hydrogen peroxide, benzoic aldehyde (or benzoic acid) and the glyoxal. The reaction may be represented by the formula,



the dotted lines showing the positions at which cleavage occurs.

The intense color of glyoxal is very interesting, the simplest diketone, diacetyl, $CH_3COCOCH_3$, is also strongly colored, whereas oxalic acid, HOCOCOOH, is absolutely colorless, yet all three substances possess in common the grouping OCCO, in one case united with hydrogen or methyl (colored), in the other combined with hydroxyl (colorless). It is tolerably certain that, of the compounds consisting only of the elements carbon, hydrogen and oxygen, glyoxal is the simplest one to exhibit color.

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Current Notes on Meteorology and Climatology

Hail-shooting—the question settled

It may be remembered that the 'hail-shooting' campaign in Europe was made the subject of a conference held at Graz in 1902. This body concluded that the results up to that time had been negative, and the hope was expressed that the experiments might be continued and carefully watched. The Italian Minister of Agriculture appointed a commission to undertake new experiments, under the presidency of Senator Blaserna. After a study of the results during the period 1902–1906 the conclusion reached by the Commission (*Att. dei Lincei,* 1906, II.; *Ciel et Terre,* January 16, 1907, 591–592) is that the five-year period has yielded an absolutely negative result. The commission reports that there is no hope of preventing damage by hail by means of the so-called 'hail-shooting,' and that protection must be sought along wholly different lines. The question may now be regarded as definitely settled.

Tropical cyclone tracks

We had occasion recently to call attention in these columns to a report by A. Schück, entitled 'Zur Kenntniss der Wirbelstürme' (Hamburg, 1905). A second report on the same subject has since been issued (dated 1906), presenting, in elaborate detail, the facts now at hand regarding the tracks of tropical cyclones in the West Indies, the Indian Ocean, and in the Pacific. Dr. Schück has made search through all available literature, and has plotted the tracks so far as known, on numerous charts. In future all students of cyclonology will need to refer to Schück's work.

THE BRÜCKNER PERIOD OF RAINFALL AT RIO DE JANEIRO

A RECENT study of rainfall at Rio de Janeiro, summarized in the *Meteorologische Zeitschrift* for January, 1907, shows that a thirty-five-year periodicity seems to prevail there. It is interesting to observe the increasing number of cases of periodicity in climatic averages which fall in line with the Brückner period. An important difference between the original work by Brückner and these later investigations is, however, this: that Brückner started on his quest without prejudice in favor of any particular period, while the more recent students of the same subject have naturally been prejudiced by the conclusions reached by the author of the now famous 'Klimaschwankungen seit 1700.'

METEOROLOGICAL PHENOMENA OF VOLCANIC ERUPTIONS

THE inflowing air currents towards volcanoes which are in active eruption, and the local whirlwinds which are sometimes generated in these currents, have been described by several writers. During the last eruption of Vesuvius (April, 1906), as pointed out by W. H. Hobbs (*Journ. Geol.*, 1906, 636–655) the windows of some houses were broken on the side away from the mountain. This is explained as having been due to the strength of the air currents which were moving towards the volcano.

TREE-PLANTING FOR SNOW-BREAKS

TREE-PLANTING has been begun along the western lines of the Canadian Pacific Railway. Over one hundred miles of trees are to be planted between Calgary and Winnipeg for snow-breaks. Experiments are to be made with tamarack for use as ties, and plantings of jack pine and tamarack are to be started at Medicine Hat in this connection.

NOTE

THE general title under which these 'Notes' have been printed since 1896 is changed with the present number of SCIENCE from *Current Notes on Meteorology* to *Current Notes on Meteorology and Climatology*. The latter title expresses more clearly the scope of the subjects which are here included, and gives deserved prominence to the geographical aspects of meteorology which are properly embraced in the term climatology.

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PHOTOGRAPHS OF FAINT STARS[1]

THE number of facts now being accumulated by means of photographs of the stars is enormous. Unfortunately, only a small portion of these facts is now available, and therefore of any use to science. This applies particularly to the faint stars. Many photographs are taken by professional and amateur astronomers, which are followed carefully during long exposures with telescopes having large apertures. In some cases, several hundred thousand stars appear upon a single plate. Unfortunately, no record has been published of many of these photographs, and therefore no use can be made of them. It is the object of the plan described below to remedy this difficulty.

The Harvard collection of photographs in part supplies this need, for stars of the thirteenth magnitude and brighter. On the average, this collection contains images of all the stars of the fifth magnitude and brighter on over a thousand nights. The number of these stars is about two thousand, the photographs are distributed throughout the last twenty years, and cover all parts of the sky. For stars of the twelfth magnitude, which can be taken with a lens of one-inch aperture and an exposure of one hour, the number is reduced to five hundred. This includes the stars in the Harvard Map of the sky, about two million in number. There are about five million stars of the thirteenth magnitude and brighter. They appear on plates taken with eight-inch doublets, and having exposures of ten minutes. About two hundred images of each of these are contained in the Harvard collection. For fainter stars, the number of images falls off very rapidly. Stars of the

[1] Harvard College Observatory, Circular 123.